PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-2

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2011 Survey Report

White Rock Reservoir

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July 31, 2012

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in White Rock Reservoir were surveyed in 2008, 2009, 2010 and 2011 using electrofishing, in 2011 using trap nets and in 2012 using gill nets. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** White Rock Reservoir, a 1,088-acre impoundment located on White Rock Creek (a tributary of the Elm Fork of the Trinity River), was constructed in 1910 by the City of Dallas as a municipal water supply; presently it is used only for recreation and flood control. The upper portion of the reservoir was dredged in 1998 and 1999 increasing the average depth of that area to 5 feet. Angler and boat access is adequate. Outboard motors on White Rock Reservoir can be no more than 10.5 HP. However, boats with larger motors can utilize the reservoir using their trolling motors. There are two handicap specific facilities on the reservoir. At the time of sampling the fishery habitat was primarily shoreline native emergent vegetation.

- **Management history:** Important sport fish include largemouth bass, white crappie, and channel catfish. All fish species are managed under statewide length and bag limits. White Rock Reservoir is an urban fishery with the majority of fishing pressure being bank angling (Brock and Hungerford 2008).

- **Fish Community**

  - **Prey species:** Gizzard and threadfin shad were present in the reservoir. Electrofishing catch rates of these species were above averages of other district reservoirs. The total catch rate of bluegill increased over the past couple of years, while the catch rate of longear sunfish fluctuated over the last three years.

  - **Catfishes:** Channel catfish were present in the reservoir. Catch rates were higher than historic averages. Blue catfish were collected for the first time since their stocking in 2007. Although only two fish were collected they were very large.

  - **White bass:** Past gill netting surveys have indicated a small population of white bass present in White Rock Reservoir. Spring gill netting surveys conducted in 2012 continued to confirm this fact with white bass being caught at a low rate.

  - **Largemouth bass:** The electrofishing catch rate of largemouth bass varied in abundance but the rates were above the district average. The catch rate of fish > 14 inches in length decreased from previous samples.

  - **White crappie:** The white crappie population was high in abundance and quality. The population exhibited fluctuations in abundance with trap net catch rate slightly lower than in previous years. However the catch rate of fish > 10 inches in length was high.

- **Management Strategies:** General monitoring with electrofishing and trap netting will be conducted in 2015 and gill netting surveys will be conducted in 2016. We also plan to work with the City of Dallas Parks and Recreation Department to improve fish habitat near fishing piers.

INTRODUCTION

This document is a summary of fisheries data collected from White Rock Reservoir in 2011-2012. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2011-2012 data for comparison.

Reservoir Description

White Rock Reservoir, a 1,088-acre impoundment located on White Rock Creek (a tributary of the Elm Fork of the Trinity River), was constructed in 1910 by the City of Dallas as a municipal water supply; presently it is used only for recreation and flood control. The upper portion of the reservoir was dredged in 1998 and 1999 increasing the average depth of that area to 5 feet. Angler and boat access is adequate. Outboard motors on White Rock Reservoir can be no more than 10.5 HP. However, boats with larger motors can utilize the reservoir using their trolling motors. There are two handicap specific facilities on the reservoir. At the time of sampling the fishery habitat was primarily native emergent vegetation. Since White Rock Reservoir is no longer used for municipal water, a staff gauge is not available to monitor water level fluctuations.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Brock and Hungerford 2008) included:

1. White Rock is located in a highly urbanized area which could lead to build up of contaminants in fish tissue. Work with TPWD contaminants personnel to analyze fish tissue for possible contamination.
   Actions: Several fish were collected and analyzed by our contaminants lab. All samples were below federal standards for human consumption concern.
2. Re-establish relationship with White Rock Lake Foundation to improve fishing at White Rock Reservoir.
   Actions: Attempts were made to re establish a relationship but the relationship did not develop.
3. White Rock Lake has several boat ramps and bank access points which do not have signage regarding fishing regulations and the boat motor horsepower restriction. Contact Dallas Parks and Recreation personnel and request signage informing fishermen about regulations and the boat motor horsepower restriction.
   Actions: Template signs were forwarded to City personnel but they were not erected.

Harvest regulation history: Sport fish populations in White Rock Reservoir have been managed with statewide regulations (Table 2).

Stocking history: The complete stocking history is in Table 3.

Vegetation/habitat history: White Rock Reservoir aquatic vegetation is primarily comprised of shoreline emergent species including cattails, bulrushes, and water willow.

METHODS

Fishes were collected by electrofishing (1.0 hours at 12 5-min stations), gill netting (5 net nights at 5 stations), and trap netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/hr) of actual electrofishing and, for gill and trap nets, as the number of fish per net night (fish/nn). All survey sites were randomly selected. All surveys, and genetic data collection procedures were conducted according to the Fishery Assessment Procedures

(TPWD,Inland Fisheries Division, unpublished manual revised 2011). No age and growth data was collected.

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distributions (PSD) as defined by Guy et al. (2007)], and condition indices [relative weight (Wr)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of native aquatic emergent vegetation and rocky shoreline. Aquatic vegetation was in the form of water willow, cattail, and bulrush (Table 4).

Prey species: The total electrofishing catch rate of gizzard shad was 837.0/hr in 2011 (Figure 1). Catch rates were highly variable from 2008-2011. Catch rates ranged from 152.0/hr in 2008 to 957.0/hr in 2009. However the average catch rate from 2008-2011 was 574.0/hr which was well above the district average of 290.0/hr. IOV for gizzard shad were more stable with the exception of the value observed in 2008 (66) with values above 95 from 2009-2011. The threadfin shad catch rate was 54.0/hr in 2011. The catch rates ranged from 29.0/hr in 2010 to 369.0/hr in 2009. The catch rate of bluegill was 547.0/hr in 2011 (Figure 2). Catch rates of bluegill averaged 519.0/hr from 2008 -2011. The number of quality sized fish (>6 inches) increased greatly indicating there is a fishable population. The catch rate of longear sunfish was 134.0/hr in 2011. Longear sunfish catch rates averaged 147.0/hr which is above the district average of 90.3/hr.

Catfishes: Blue catfish were captured for the first time since the initial stocking that occurred in summer 2007. Although only two fish were captured, they were large fish (both 26 inches in length) with good body condition (128 average relative weight).

The gill netting catch rate of channel catfish was 3.4/nn in 2012 (Figure 3). This catch rate was less than the previous catch rate in 2008 and slightly lower than the district average (5.6/nn). Size structure of the population was very good as indicated by the PSD value of 81. The population seemed to have benefitted from previous stockings.

White bass: The gill netting catch rate of white bass in 2012 (0.6/nn) was well below the district average of 7.7/nn (Figure 4). This is similar to historical catch rates.

Largemouth bass: The total electrofishing catch rate of largemouth bass was 185.0/hr in 2011. The catch rate averaged 225.0/hr from 2008-2011 which is above the district average of 132.5/hr. The catch rates ranged from 185.0/hr in 2011 to 291.0/hr in 2010 (Figure 5). Catch rates of largemouth $\geq$ 14 inches was consistent from 2008-2011 with a rate of 16.0/hr observed in 2011. Despite the high catch rates, body conditions have remained excellent (relative weight above 100) for all size classes of fish (Figure 10). The size structure of the population remained average as reflected in a PSD value of 39 observed in 2011. Florida largemouth bass (FLMB) influence was low as Florida alleles were 24% in 2011 and Florida genotype was 0 (Table 5). Although this is low, FLMB stockings are not warranted at this time.

White crappie: The trap netting catch rate of white crappie was 58.2/nn in 2011, with a tremendously high catch rate of crappie $\geq$ 10 inches of 19.0/nn. The total catch rate is surprisingly lower than the catch rate observed in 2007 (69.8/nn) (Figure 6). However the catch rate in 2011 was much higher than the district average of 17.0/nn. The PSD in 2012 was 79 indicating excellent size structure.

Fisheries management plan for White Rock Reservoir, Texas

Prepared – July 2012.

ISSUE 1: White Rock is located in a highly urbanized area which has several fishing piers that are utilized by anglers.

MANAGEMENT STRATEGY

1. Work with City of Dallas Parks and Recreation Department to establish artificial habitat near the fishing piers. Because of the shallow water surrounding most of the piers, installation of habitat structures for this environment may be difficult.

ISSUE 2: White Rock Lake has several boat ramps and bank access points which do not have signage regarding fishing regulations and the boat motor horsepower restriction.

MANAGEMENT STRATEGY

1. Contact Dallas Parks and Recreation personnel and request signage informing fishermen about regulations and the boat motor horsepower restriction.

ISSUE 3: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. Giant Salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Contact and educate marina owners about invasive species, and provide them with posters, literature, etc… so that they can in turn educate their customers.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

SAMPLING SCHEDULE JUSTIFICATION

General monitoring of sport fish species with electrofishing, trap netting, and gill netting will be conducted every 4 years.

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Anderson, R.O, and R.M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

Brock, R. and T. Hungerford. 2008. Statewide freshwater fisheries monitoring and management program survey report for White Rock Reservoir, 2007. Texas Parks and Wildlife Department, Federal Aid Report F-30-R31, Austin.

DiCenzo, V.J., M.J. Maceina, and M.R. Stimpert. 1996. Relations between Reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16: 888-895.

Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional Size Distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32(7):348.

Table 1. Characteristics of White Rock Reservoir, Texas.

Characteristic	Description
Year Constructed	1910
Controlling authority	City of Dallas
County	Dallas
Reservoir type	Tributary of Trinity River
Conductivity	360 umhos/cm

Table 2. Harvest regulations for White Rock Reservoir.

Species	Bag Limit	Length Limit (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 minimum
Catfish, flathead	5	18 minimum
Bass, white	25	10 minimum
Bass: largemouth	5	14 minimum
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 minimum

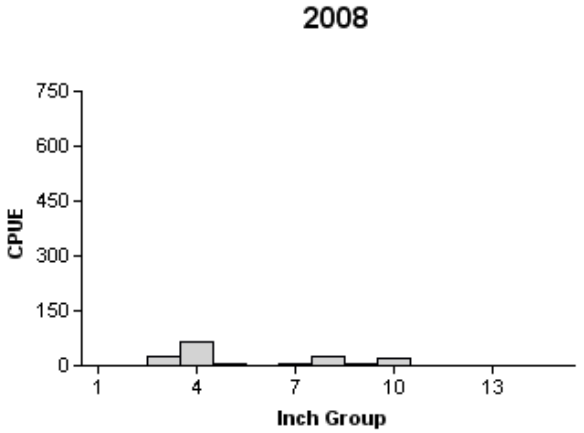
Table 3. Stocking history of White Rock Reservoir, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

Species	Year	Number	Life Stage	Mean TL (in)
Blue catfish	1988	15	ADL	15.8
	2007	107,354	FGL	2.6
	Total	107,369		
Channel catfish	1979	1,315	AFGL	7.9
	1979	935	UNK	UNK
	1980	17,431	AFGL	7.9
	1981	22,380	AFGL	7.9
	1986	1,883	AFGL	11.0
	2000	293,146	FGL	3.0
	2004	10,551	AFGL	7.8
	2008	163	ADL	20
	Total	347,804		
Florida Largemouth bass	1978	1,150	AFGL	4.0
	1982	10,000	FGL	2.0
	1992	112,030	FGL	1.1
	1996	112,468	FGL	1.5
	Total	235,648		
Largemouth bass	1968	300,000	UNK	UNK
	1995	10	ADL	18.9
	2001	13	ADL	16.5
	Total	300,023		
Palmetto Bass (striped X white bass hybrid)	1975	20,000	UNK	UNK
	1977	9,900	UNK	UNK
	Total	29,900		
Red drum	1976	2,200	UNK	UNK
	Total	2,200		
Walleye	1978	4,500,000	FRY	0.2
	1979	3,360,000	FRY	0.2
	Total	7,860,000		

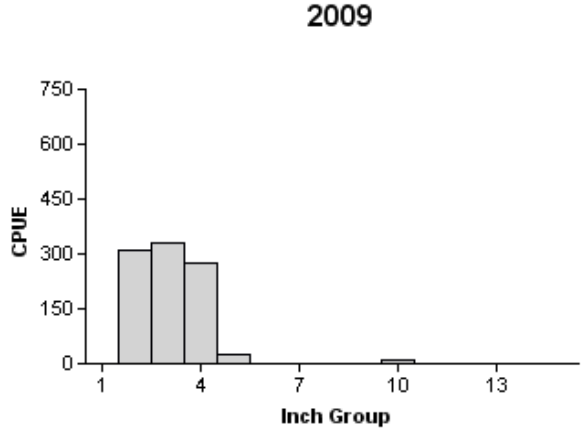
Table 4. Survey of littoral zone and physical habitat types, White Rock Reservoir, Texas, 2011. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for boat docks and each type of aquatic vegetation found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Boat docks			6.8	0.6
Native emergent + rocky shoreline	8.3	93		
Bulkhead	0.6	7		

Gizzard Shad



Effort = 1.0
Total CPUE = 152.0 (19; 152)
Stock CPUE = 57.0 (39; 57)
IOV = 66 (11.8)



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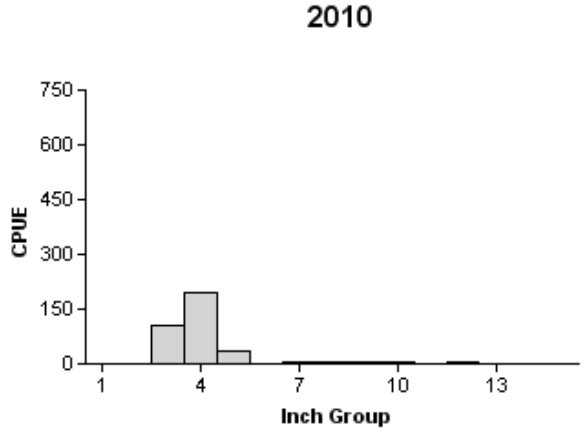
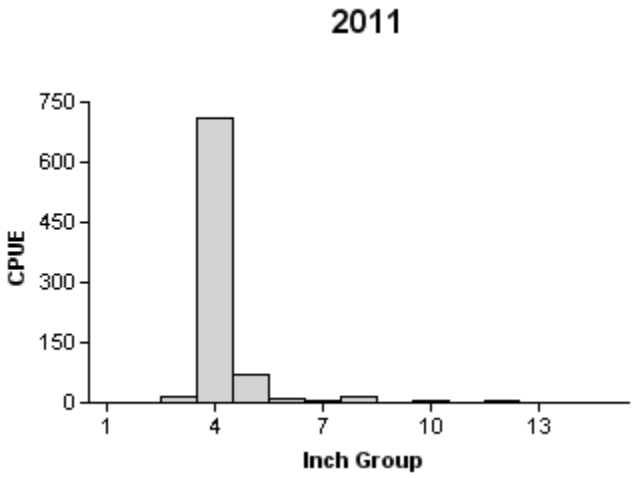
Stock CPUE = 15.0 (24; 15)
IOV = 98 (0.4)



Effort = 1.0
Total CPUE = 353.0 (20; 353)
Stock CPUE = 20.0 (36; 20)
IOV = 95 (2)

Figure 1. Number of gizzard shad caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, White Rock Reservoir, Texas, 2008-2011.

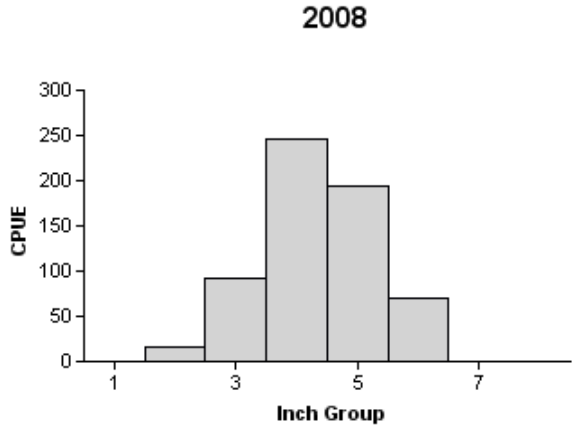
Gizzard Shad



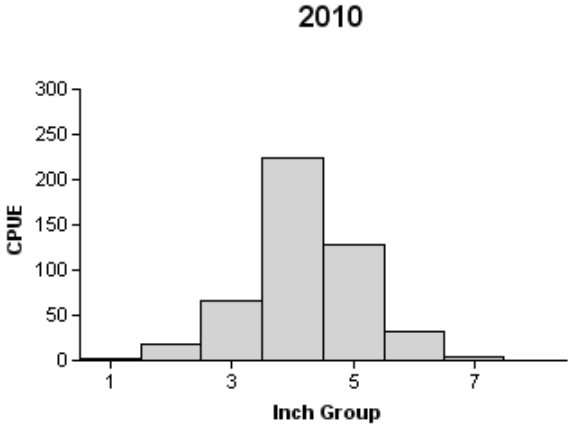
Effort = 1.0
Total CPUE = 837.0 (20; 837)
Stock CPUE = 31.0 (26; 31)
IOV = 97 (0.9)

Figure 1 continued.

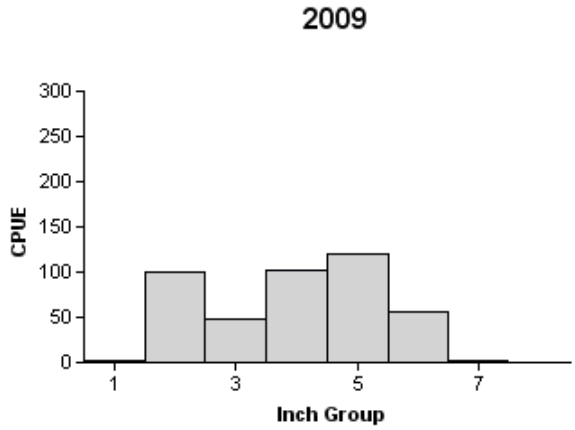
Bluegill



Effort = 1.0
Total CPUE = 622.0 (15; 622)
Stock CPUE = 605.0 (15; 605)
CPUE-6 = 71.0 (24; 71)
PSD = 12 (2.3)



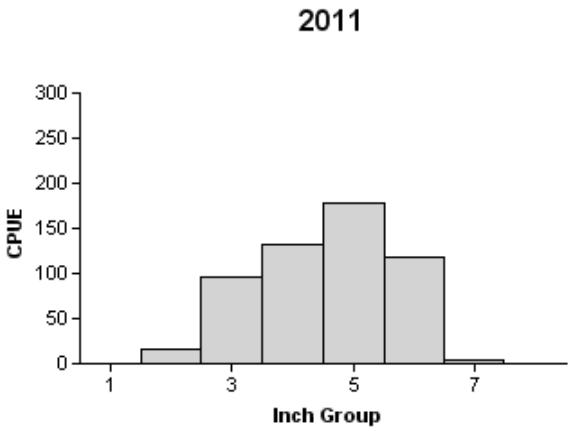
Effort = 1.0
Total CPUE = 477.0 (22; 477)
Stock CPUE = 457.0 (23; 457)
CPUE-6 = 37.0 (24; 37)
PSD = 8 (1.7)



Effort = 1.0
Total CPUE = 431.0 (15; 431)
Stock CPUE = 328.0 (14; 328)
CPUE-6 = 58.0 (21; 58)
PSD = 18 (2.8)

Figure 2. Number of bluegill caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, White Rock Reservoir, Texas, 2008-2011.

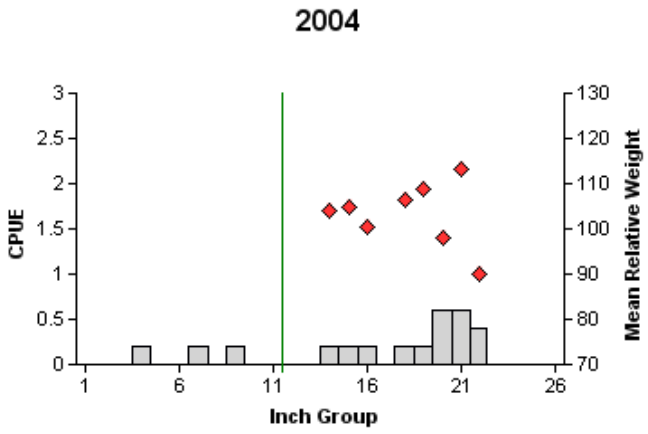
Bluegill



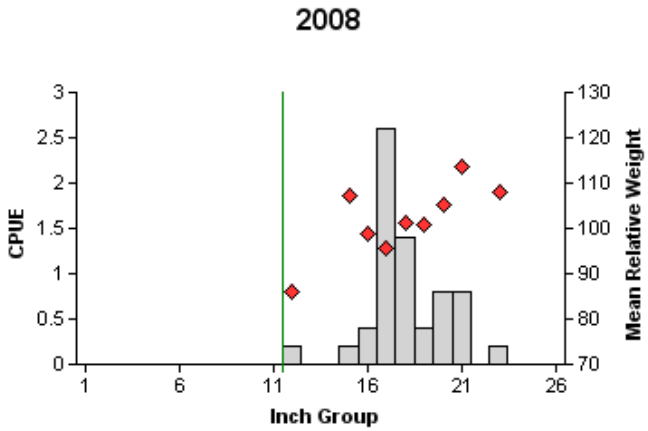
Effort = 1.0
Total CPUE = 547.0 (12; 547)
Stock CPUE = 530.0 (12; 530)
CPUE-6 = 123.0 (16; 123)
PSD = 23 (3.1)

Figure 2 continued.

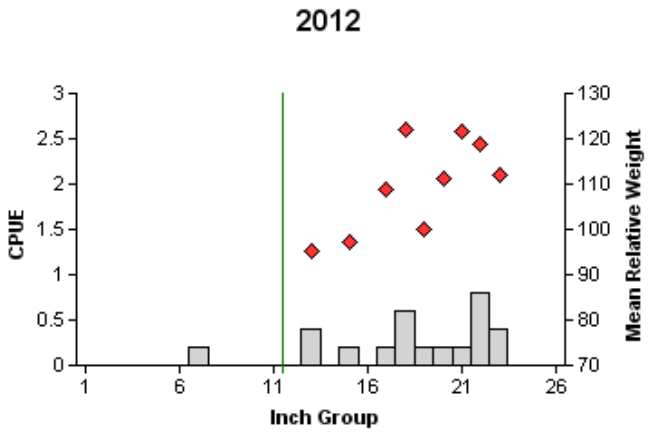
Channel Catfish



Effort = 5.0
Total CPUE = 3.2 (12; 16)
CPUE-12 = 2.6 (15; 13)
PSD = 85 (7.4)



Effort = 5.0
Total CPUE = 7.0 (16; 35)
CPUE-12 = 7.0 (16; 35)
PSD = 94 (5.1)



Effort = 5.0
Total CPUE = 3.4 (24; 17)
CPUE-12 = 3.2 (23; 16)
PSD = 81 (10.6)

Figure 3. Number of channel catfish caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting survey, White Rock Reservoir, Texas, 2004, 2008 and 2012. Vertical line represents length limit at time of sampling.

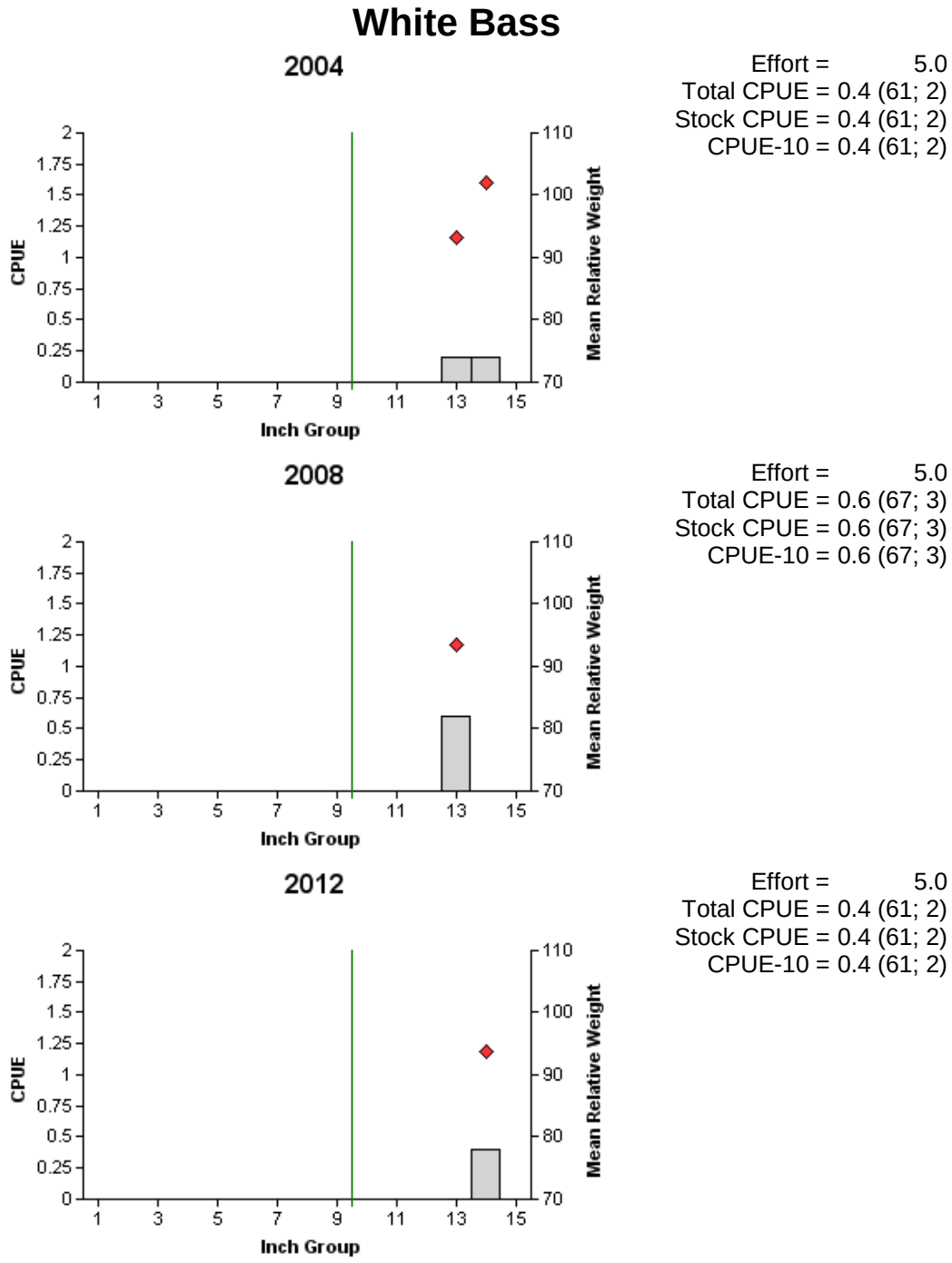
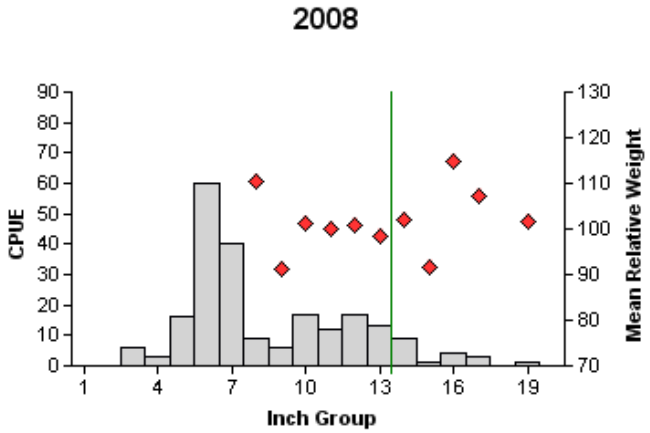
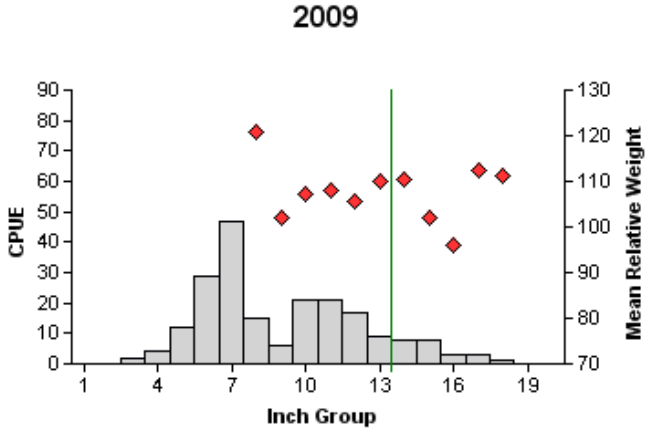


Figure 4. Number of white bass caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill netting surveys, White Rock Reservoir, Texas, 2004, 2008, and 2012. Vertical line represents length limit at time of sampling.

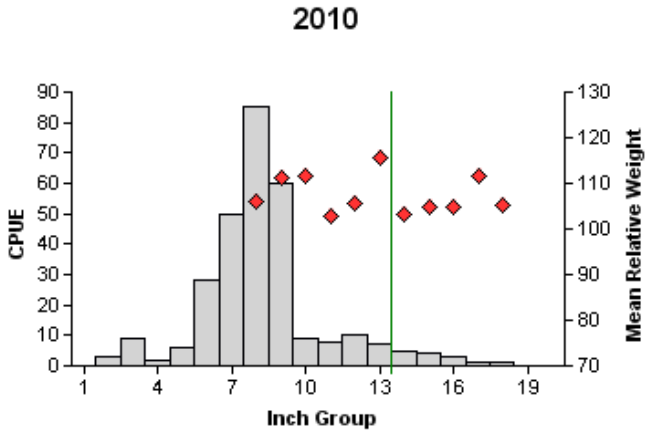
Largemouth Bass



Effort =	1.0
Total CPUE =	217.0 (19; 217)
Stock CPUE =	92.0 (19; 92)
CPUE-14 =	18.0 (19; 18)
PSD =	52 (5.3)
PSD-P =	10 (2.7)



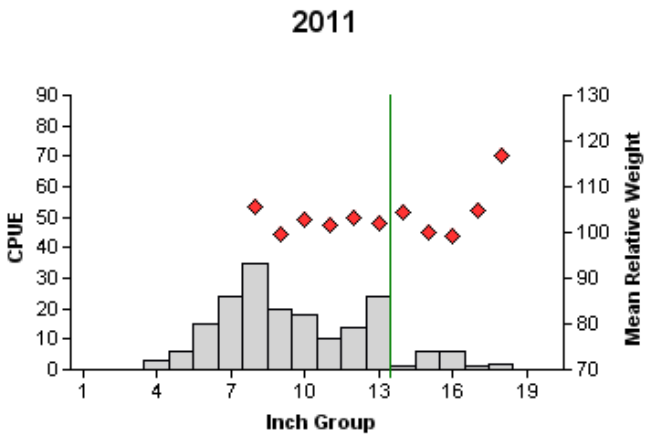
Effort =	1.0
Total CPUE =	206.0 (10; 206)
Stock CPUE =	112.0 (8; 112)
CPUE-14 =	23.0 (27; 23)
PSD =	44 (6.7)
PSD-P =	13 (3)



Effort =	1.0
Total CPUE =	291.0 (15; 291)
Stock CPUE =	193.0 (17; 193)
CPUE-14 =	14.0 (28; 14)
PSD =	16 (3)
PSD-P =	5 (1.4)

Figure 5. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, White Rock Reservoir, Texas, 2008-2011. Vertical lines represent minimum length limit at time of sampling.

Largemouth Bass



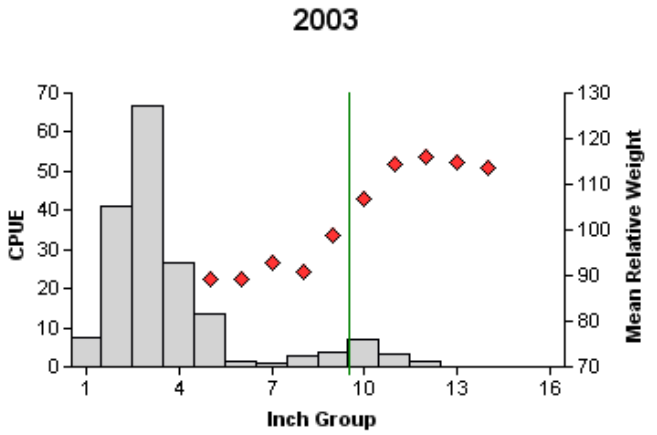
Effort =	1.0
Total CPUE =	185.0 (19; 185)
Stock CPUE =	137.0 (20; 137)
CPUE-14 =	16.0 (21; 16)
PSD =	39 (5.4)
PSD-P =	11 (2.7)

Figure 5 continued.

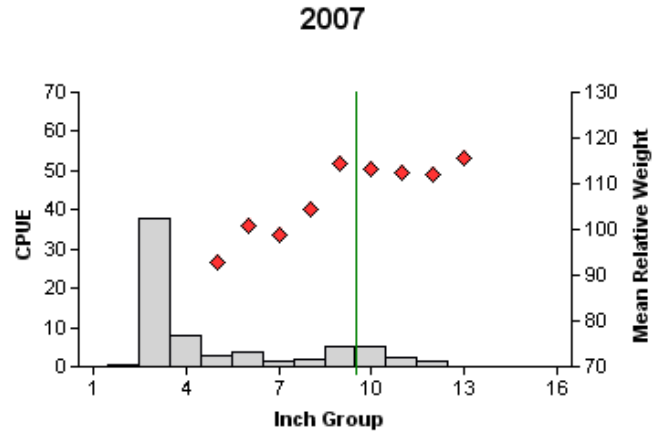
Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, White Rock Reservoir, Texas, 2011. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass.

Year	Sample size	% FLMB alleles	%NLMB alleles	F genotypes	N genotypes	F1
2011	30	24	76	0	13	0

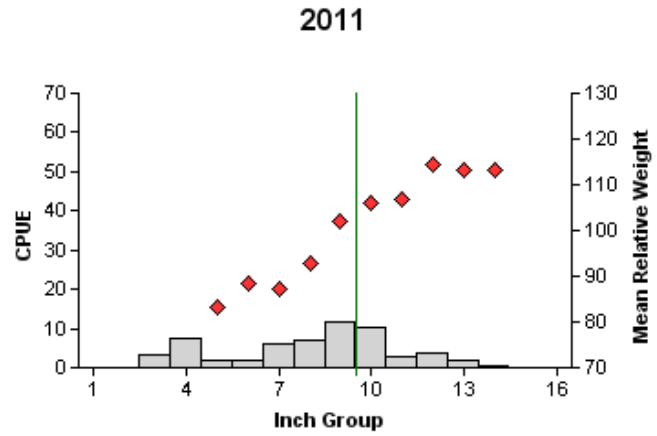
White Crappie



Effort = 5.0
Total CPUE = 176.0 (37; 880)
Stock CPUE = 34.2 (18; 171)
CPUE-10 = 12.2 (34; 61)
PSD = 54 (11.8)
PSD-P = 36 (11.5)



Effort = 5.0
Total CPUE = 69.8 (31; 349)
Stock CPUE = 23.6 (22; 118)
CPUE-10 = 9.0 (14; 45)
PSD = 69 (4)
PSD-P = 38 (5.7)



Effort = 5.0
Total CPUE = 58.2 (41; 291)
Stock CPUE = 47.4 (43; 237)
CPUE-10 = 19.0 (44; 95)
PSD = 79 (1.2)
PSD-P = 40 (6)

Figure 6. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, White Rock Reservoir, Texas, 2003, 2007 and 2011. Vertical line represents length limit at time of sampling.

Table 6. Proposed sampling schedule for White Rock Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard surveys are denoted by S and additional surveys denoted by A.

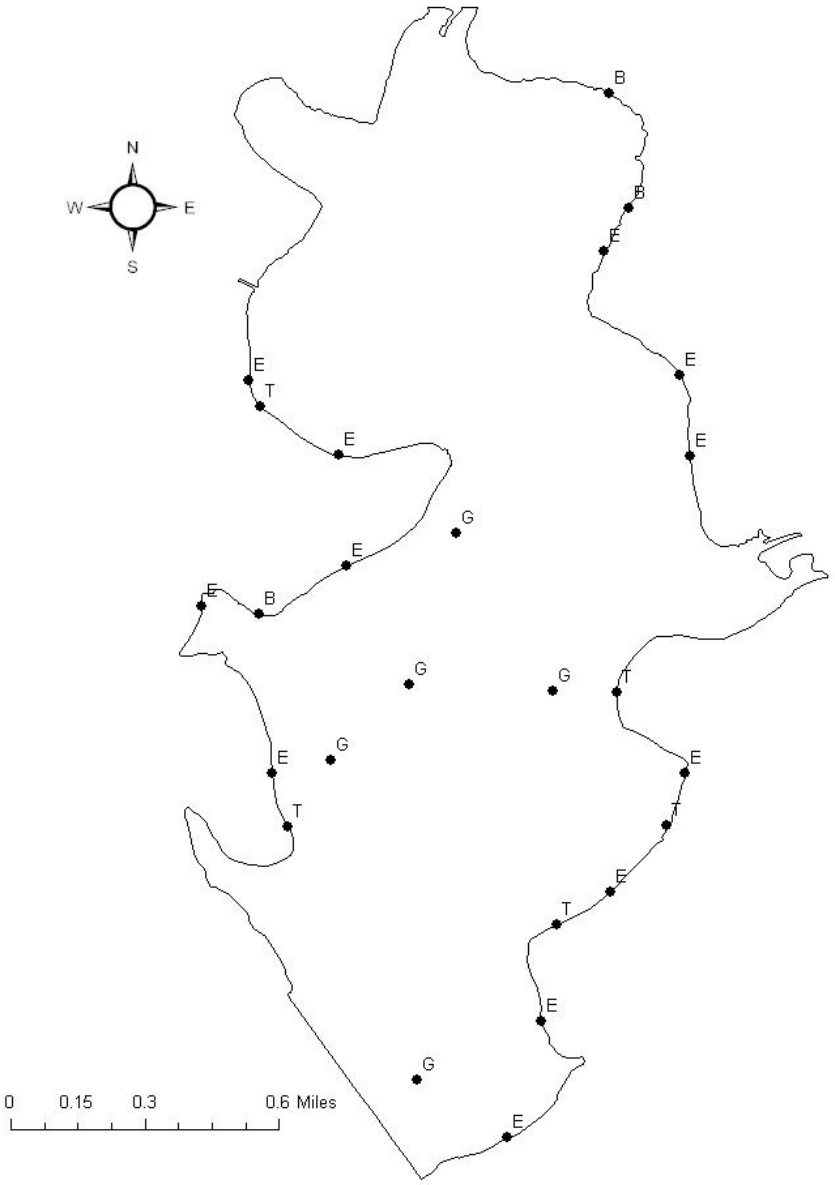
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Vegetation Survey	Access Survey	Report
Fall 2012-Spring 2013							
Fall 2013-Spring 2014							
Fall 2014-Spring 2015							
Fall 2015-Spring 2016	S	S	S		S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from White Rock Reservoir, Texas, 2011-2012.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad	254	50.8			837	837.0
Threadfin shad					54	54.0
Common carp	2	0.4				
Smallmouth buffalo	101	20.2				
Spotted sucker	2	0.4				
Blue catfish	2	0.4				
Channel catfish	17	3.4				
White bass	2	0.4				
Yellow bass	32	6.4				
Bluegill					547	547.0
Longear sunfish	1	0.2			134	134.0
Largemouth bass					185	185.0
White crappie	4	0.8	291	58.2		

APPENDIX B



Location of sampling sites, White Rock Reservoir, Texas, 2011-2012. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Boat ramps are indicated with a B.

APPENDIX C

Historical catch rates for targeted species by gear type for White Rock Reservoir, Texas.

		Year														
Gear	Species	1996	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Gill Netting	Channel catfish	0.8	2.0					3.2				7.0				3.4
(fish/net night)	White bass	0.6	1.4					0.4				0.6				0.4
Electrofishing	Gizzard shad	47.0	362.0		324.0	149.0	100.0	90.0	213.0	415.0	274.0	152.0	957.0	353.0	837.0	
(fish/hour)	Threadfin shad	57.0	177.0		0.0	9.0	47.0	255.0	402.0	348.0	30.0	125.0	369.0	29.0	54.0	
	Bluegill	129.0	61.0		190.0	78.0	210.0	108.0	300.0	296.0	423.0	622.0	431.0	477.0	547.0	
	Longear sunfish	33.0	14.0		102.0	46.0	141.0	54.0	158.0	88.0	124.0	163.0	112.0	180.0	134.0	
	Largemouth bass	318.0	302.0		100.0	90.0	100.0	50.0	212.0	177.0	154.0	217.0	206.0	291.0	185.0	
Trap Netting (fish/net night)	White crappie	6.6	13.4				176.0				69.8				58.2	